

## **REMARKS**

In the April 4, 2008 Office Action, the Knapp et al. reference was relied upon for the first time, in combination with Bradley et al., as the basis for rejecting independent claim 1 and (further in view of Baumhauer Jr. et al.) independent claim 12 under 35 U.S.C. §103(a).

Applicant notes with appreciation the telephone interview courteously afforded the undersigned representative of the Applicant on June 30, 2008. The following summarizes the discussion in that telephone interview.

In order to obtain good directionality for a directional microphone system that is formed by combining several omnidirectional microphones, it is necessary for all of the omnidirectional microphones in the direction microphone system to be matched to each other in terms of amplitude and phase, namely all of the omnidirectional microphones should have the same (equalized or matched) amplitude and phase characteristics.

Amplitude matching is relatively easy to accomplish, but phase matching, done in the conventional manner disclosed in the references of record, is complicated because it is conventionally necessary to measure phase shifts, which is considerably more difficult than making an amplitude measurement.

In the method and apparatus of claims 1 and 13, the procedure for matching the phase and amplitude characteristics of omnidirectional microphones that are being combined to form a direction microphone system is simplified, by undertaking the necessary phase and amplitude matching in two separate steps.

Applicant acknowledges that the Bradley et al. reference discloses a hearing aid having a directional microphone system. As the Examiner has acknowledged,

the Bradley et al. reference does not disclose automatically equalizing or matching microphone signals in the manner set forth in claims 1 and 13. The Examiner relied on the Knapp et al. reference as, according to the Examiner, disclosing a method for automatically equalizing microphone signals that includes the steps of equalizing respective amplitudes of respective microphone signals (for which the Examiner cited column 1, lines 51-65) and equalizing the respective amplitudes by phase shifting the microphone signal generated by at least one of the microphones, the Examiner citing Figure 2 and column 4, lines 11-15 for this purpose.

Applicant submits that the Knapp et al. reference is not at all concerned with the problem of microphone matching or equalization. The Knapp et al. reference discloses a particular way to construct a directional microphone by combining a number of omnidirectional microphones. For this purpose, the Knapp et al. reference assumes that the omnidirectional microphones that are employed for this purpose are already well-matched to each other, meaning that all of these omnidirectional microphones have substantially the same transfer function. If this were not the case, the functionality which is the intended result of the Knapp et al. reference could not be achieved.

As the Examiner has noted, the Knapp et al. reference does discuss introducing a delay in a microphone signal, however, in the Knapp et al. reference this is not for the purpose of matching respective microphones or the respective microphone signals therefrom, in order to compensate for a transfer time difference, but is instead for the purpose of producing the desired directionality. In doing so, the microphone signals in Knapp et al., which originate from acoustic signals that are detected by the microphones at the same time, are emitted from the respective

microphones out of phase, due to the intentionally introduced delay. This phase delay or phase shift is essential to achieving the directionality that is intended in the Knapp et al. system.

Therefore, the Knapp et al. reference provides teachings that are opposite to the subject matter disclosed and claimed in the present application. In the Knapp et al. reference, the microphones, if the steps disclosed in the Knapp et al. reference were not undertaken, would emit equal (matched) microphone signals, but this is not wanted in the Knapp et al. system since equal (matched) microphone signals would not produce the desired delay. In the Knapp et al. reference, therefore, a relative delay is intentionally introduced into one of these signals, which is the opposite of the matching or equalization that takes place in claims 1 and 13 of the present application.

Differences in the amplitude are not discussed at all in the Knapp et al. reference.

In the telephone interview, the Examiner stated that the use of the term “equalizing” in the previous claim language was still considered by the Examiner to have a scope that is broader than the above arguments. It was agreed at the interview that changing the “equalizing” in the claims to “matching”, accompanied by a statement that the matching results in the amplitudes in question being made equal to each other, would overcome the current rejection based on Bradley et al and Knapp et al.

It was also agreed in the telephone interview that although the word “matching” is not explicitly used in the present specification, the statements in paragraph [0018] of the published version of the present application provides support


for the amendments that are being made in the claims, by virtue of the statement that "The microphone signals are then compensated such that after the equalization the temporally averaged acoustic field energy at least approximately coincides in all microphone signals." As stated in the telephone interview, the term "equalization" or "equalizing" as used in the original specification and claims was intended to be synonymous with the term "matching" that is now used, in accordance with the Examiner's preference.

The Examiner in the telephone interview also stated that making such a change after the final rejection would raise a new issue requiring further searching or consideration, and therefore it would be necessary to file an RCE in order to have such an amendment entered and considered. The present Amendment is therefore accompanied by the filing of an RCE.

Applicant recognizes that the Examiner will conduct an updated search of the prior art. Assuming that no further relevant prior art is located in the updated searching, Applicant submits that the present application is in condition for allowance, and early reconsideration of the application is respectfully requested.

The Commissioner is hereby authorized to charge any additional fees which may be required, or to credit any overpayment to account No. 501519.

Submitted by,



(Reg. 28,982)

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